

## Analogies between linear and circular motion

(Summary of Chapter 11, Serway)

Uniform linear motion		Uniform circular motion	
position	$x$	angular position	$\theta$
velocity	$v = \frac{dx}{dt}$	angular velocity	$\omega = \frac{d\theta}{dt}$
acceleration	$a = \frac{dv}{dt}$	angular acceleration	$\alpha = \frac{d\omega}{dt}$
equations of motion			
$x = x_0 + v_0 t + \frac{1}{2} a t^2$		$\theta = \theta_0 + \omega_0 t + \frac{1}{2} \alpha t^2$	
$v = v_0 + at$		$\omega = \omega_0 + \alpha t$	
mass	$m$	moment of inertia	$I = \int_V r_{\text{perp}}^2 dm$
force	$F = ma$	torque	$\tau = I\alpha$
	$F = \frac{dp}{dt}$		$\tau = \frac{dL}{dt}$
momentum	$p = mv$	angular momentum	$L = I\omega$
kinetic energy			
$K = \frac{1}{2}mv^2$		$K = \frac{1}{2}I\omega^2$	
Work			
$W = \int F ds$		$W = \int \tau d\theta$	
Power			
$P = Fv$		$P = \tau\omega$	